INTRODUCING NUCLEAR ENERGY TO HIGH-SCHOOL STUDENTS: THE SPANISH YOUNG GENERATION IN NUCLEAR (JÓVENES NUCLEARES) LECTURES

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ABSTRACT

One of the main goals of Spanish Young Generation (JJNN) is to spread knowledge about nuclear energy, not only pointing out its advantages and its role in our society, but also trying to correct some of the ideas that are due to the biased information and to the lack of knowledge.
With this goal in mind, lectures were given in several high schools, aimed at students ranging from 14 to 18 years old. This paper explains the experience accumulated during those talks and the conclusions that can be drawn, so as to better focus the communication about nuclear energy, especially the one aimed at a young public.
In order to evaluate the degree of knowledge and information on a specific topic of a given group of individuals, statistical methods must be used. At the beginning of each lecture (and sometimes at the end, in order to evaluate the impact of the talk) the students were submitted to a short survey conducted by Spanish Young Generation. It consisted in eight questions, dealing with the relation between the main environmental issues (global warming, acid rain, radioactive waste…) and nuclear energy. The answers can be surprising, especially for professionals of the nuclear field who, since they are so familiar with this topic, often forget that this is just the case of a minority of people. A better knowledge of the degree of information of a given group enables to focus and personalize the communication. Another communication tool is the direct contact with students: it starts with their questions, which can then lead to a small debate. If the surveys inform about the topics they are unaware of, the direct exchange with them enables to find the most effective way to provide them the information. Of course, it depends a lot on the public attending the talk (age, background…) and on the debate following the talk: a good communication, adapted to the public, is necessary.
Therefore, the outcome of the performed exercise is that Spanish teenagers have still a lack of knowledge about nuclear energy. We can learn that items that are evident for nuclear young professionals are unknown for high school teenagers.

1. Introduction

Spanish Young Generation in Nuclear (Jóvenes Nucleares) is a commission of the Spanish Nuclear Society (SNE) which main goals are to spread knowledge over the society about nuclear energy.

One of the difficulties is not only pointing out its advantages and its role in our society, but also trying to correct some of the ideas that are due to the biased information and to the lack of knowledge.

With this goal in mind, lectures were given in several high schools, aimed at students ranging from 14 to 18 years old. This paper explains the experience accumulated during those talks and the conclusions that can be drawn, so as to better focus the communication about nuclear energy, especially the one aimed at a young public.

2. The lectures and the surveys

In each one of the high schools, the lectures are conducted by a JJNN member which normally is a young worker of the nuclear area. It helps to reduce the gap in the communication between high school students and the lecturer, as the knowledge transfer is known to be more effective as the age difference is lower.

The lectures are based on general information about nuclear energy. First of all, the lecturer provides some basic concepts about nuclear physics and how the electrical energy is produced from uranium. Then, the idea is to bring the audience a broad vision of every field in nuclear energy: nuclear safety, radiation protection, waste management, etc.

The most popular questions of the students are normally those which involve nuclear accidents such as Chernobyl and, unfortunately from March, Fukushima and waste management. The students are eager to learn the real data and precise information about these popular areas and how reliable the news they have heard are.

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It consisted in eight questions, dealing with the relation between the main environmental issues (global warming, acid rain, radioactive waste…) and nuclear energy.

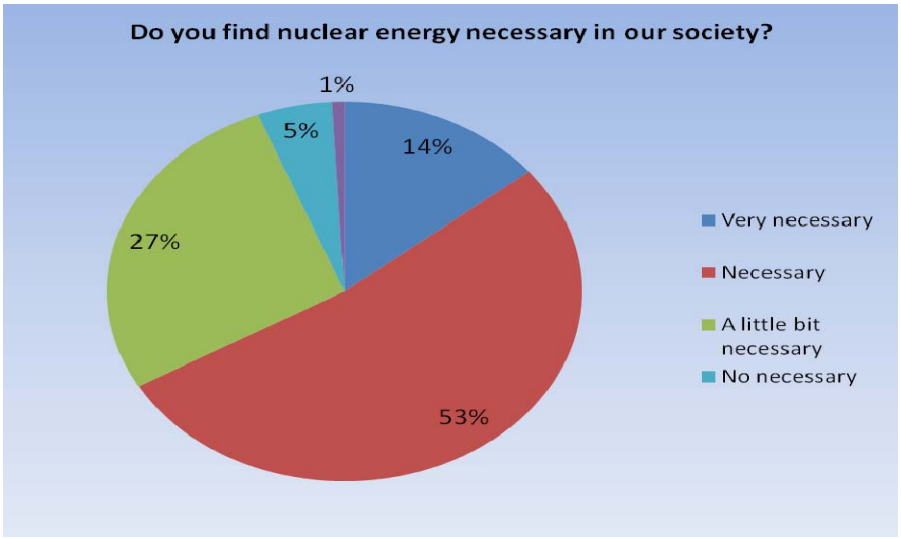
Some of the answers can be surprising; especially for professionals of the nuclear field who, since they are so familiar with this topic, often forget that this is just the case of a minority of people. A better knowledge of the degree of information of a given group enables to focus and personalize the communication.

Another communication tool is the direct contact with students: it starts with their questions, which can then lead to a small debate. If the surveys inform about the topics they are unaware of, the direct exchange with them enables to find the most effective way to provide them the information.

Of course, it depends a lot on the public attending the talk (age, background…) and on the debate following the talk: a good communication, adapted to the public, is necessary.

3. Statistical results of the surveys

In this section, the results of most relevant answers to the survey are shown.



- **Figure 1. Answers to the question: Do you find nuclear energy necessary in our society?**

The results are surprising since Spanish people have always been against nuclear energy

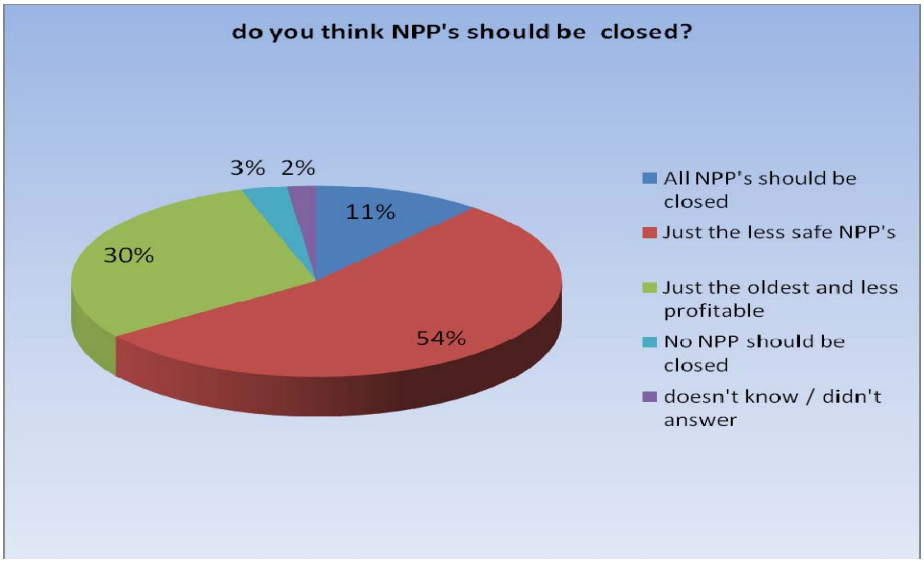


Figure 2. Answers to the question: do you think NPP's should be closed?

Most of the students attach importance to nuclear safety, more than plant profitability

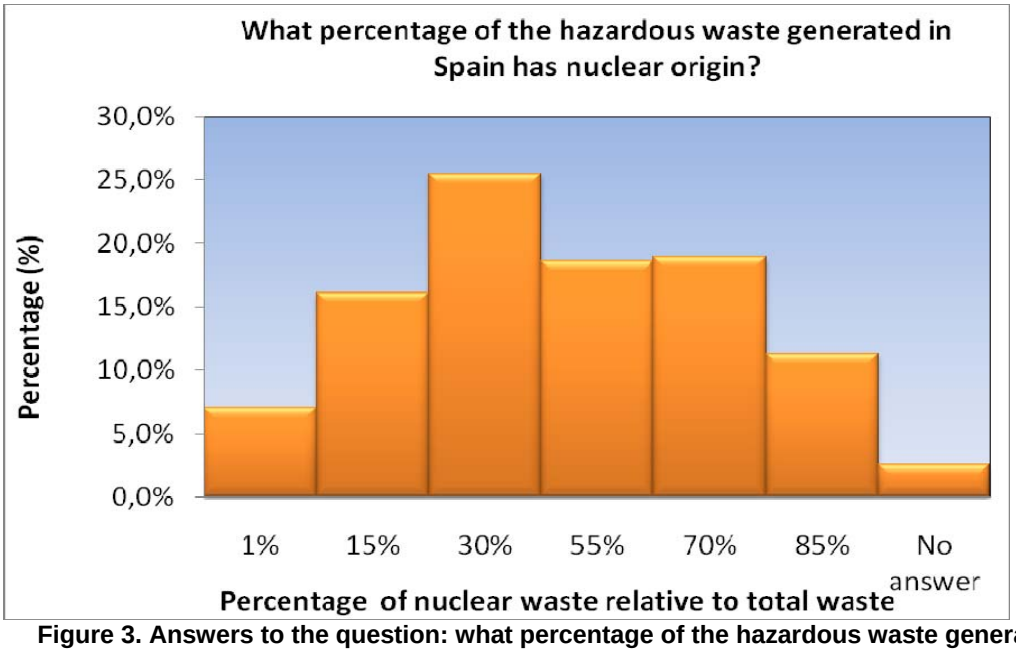


Figure 3. Answers to the question: what percentage of the hazardous waste generated in Spain had nuclear origin?

The answers show a wide range of students' opinions; it is important to highlight that less than 8% of the students answered this question correctly.

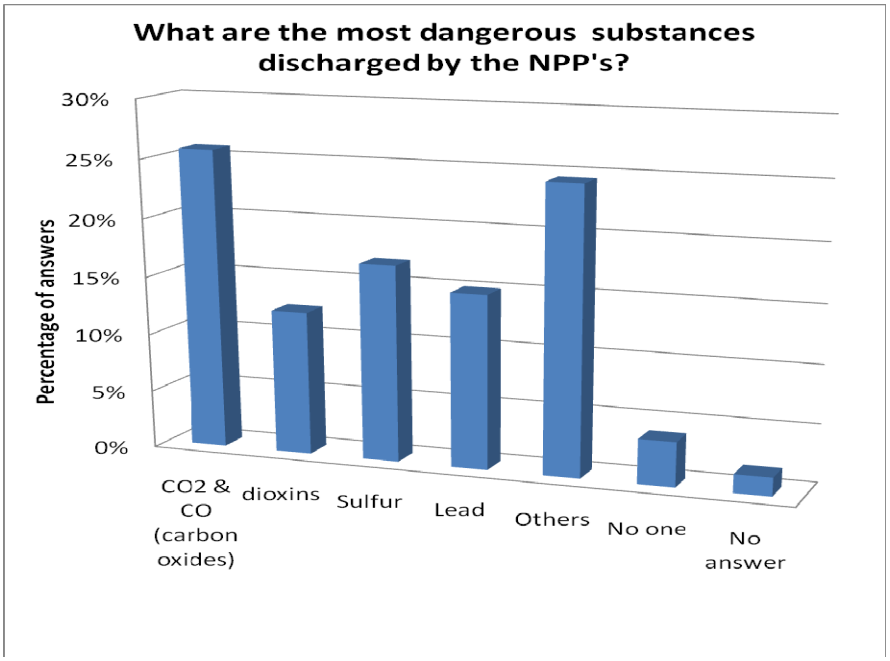


Figure 4. Answers to the question: what are the most dangerous substances discharged by the NPP's?

The ignorance about what kind of substances can discharge a nuclear plant is fairly widespread and wrong nonsense answers are also typical.

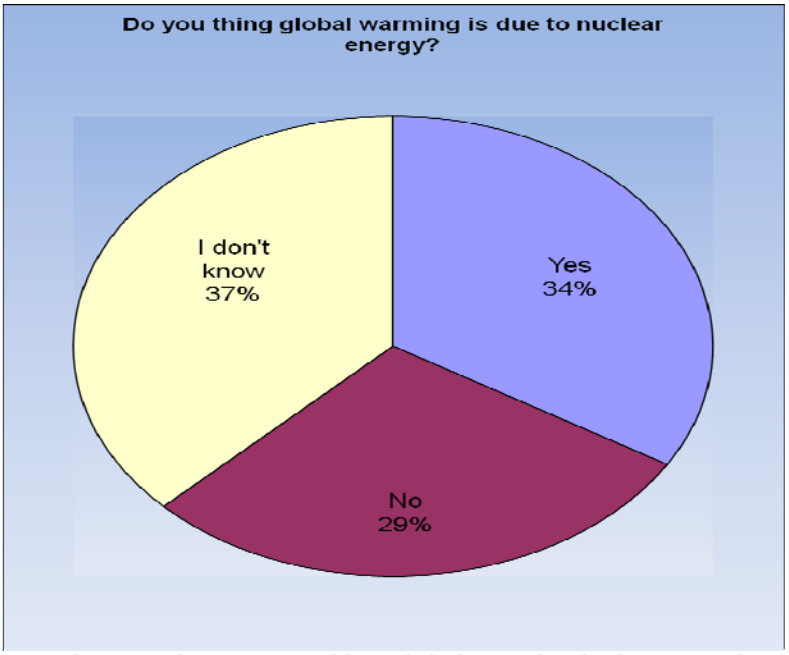


Figure 5. Answers to the question: Do you thing global warming is due to nuclear energy?

Only a third of the students are sure that nuclear energy has nothing to do with climate change.

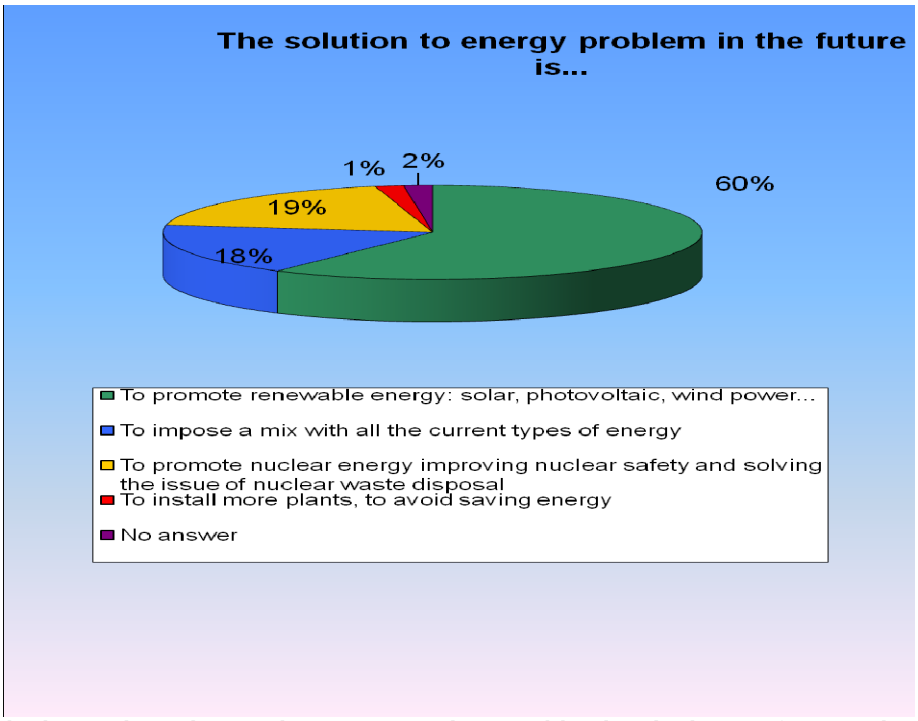


Figure 6. Final question: choose the statement that would solve the issue of energy in the future

Most students want to increase the weight of renewable energy to solve the energy problem of the future

4. Conclusion

Therefore, the outcome of the performed exercise is that Spanish teenagers have still a lack of knowledge about nuclear energy. We can learn that items that are evident for nuclear young professionals are unknown for high school teenagers.

It is considered that the sample of 354 teenagers of different Spanish high schools is big enough to draw preliminary conclusions.
Nevertheless, in order to make the sample more representative of the Spanish teenagers' perception of nuclear energy, it is necessary to have more opinions and more answers to the surveys.

The main conclusions are the following:

- Spanish teenagers think that nuclear energy is necessary in our society.
- Nuclear safety has more importance for them than plant profitability.
- There is an obvious lack of information about the quantity of hazardous waste generated by nuclear power plants.
- Spanish teenagers still believe that nuclear power plants are responsible for some environmental problems that are obviously not related with nuclear power plants
- The Spanish teenagers that are opposed to nuclear energy usually justify their position by accusing nuclear energy to be responsible of all environmental problems: acid rain, oil sick, greenhouse effect…